



The following Independent report on the effectiveness of CosaTron in improving indoor air quality was prepared for Jerry Van Couwenberghe, Assistant Engineering Manager at Greektown Casino and Resort in Detroit, MI.

We would like to thank Greektown Casino and Resort for giving us permission to share this report with other interested parties.

CosaTron  
September, 2012

# **Cosatron Filter Evaluation Sampling Report Greektown Casino**

## **RTU 03, RTU 022 and RTU023**

**Located at**

**1200 Antoine, Detroit, MI 48226**

**Date of Inspection: January 14 and January 21, 2012  
Date of Report: January 31, 2012**

**PREPARED FOR:**

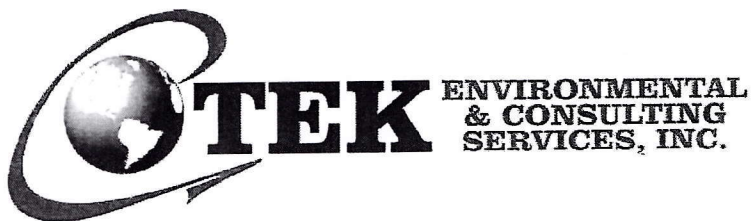
Mr. Kevin Dillon  
Senior Account Executive  
Di Hydro  
40833 Brentwood  
Sterling Heights, MI 48310  
[kevin@dihydro.com](mailto:kevin@dihydro.com)

**Prepared By:**

Tyler S. Lenling, RPIH  
Senior Level Industrial Hygienist /Indoor Air Quality Manager



**TEK Project Number CI0291/002 and 003**



January 31, 2012

Mr. Kevin Dillon  
Senior Account Executive  
Di Hydro  
40833 Brentwood  
Sterling Heights, MI 48310  
[kevin@dihydro.com](mailto:kevin@dihydro.com)

**Subject: Cosatron Filter Evaluation Sampling Report**  
**RTU 03, RTU 022 and RTU023**  
**Greentown Casino-Gaming Area**  
**Located at 1200 St. Antoine, Detroit, Michigan 48226**  
**TEK Project Number: CI0291/002 and 003**

Dear Mr. Dillon:

TEK Environmental & Consulting Services, Inc. (TEK) was retained by, Mr. Kevin Dillon, on behalf of the Greentown Casino, to conduct baseline airborne particulate sampling through Particulate and TEM size mapping of Particulates for indoor air quality parameters pursuant to NIOSH 0500 (Total airborne particulate not otherwise regulated). Samples were collected within RTU air handlers 03, 22, and 23 on the roof top servicing the air of the Casino Gaming Floor. The purpose of the visit was to determine current airborne particulates without the use of the Cosatron System in operation and an additional sampling event with the Cosatron System operating to determine the effectiveness of the filtration. All sampling was performed to determine the amount of particulates captured by weight and the size of the particulates captured after passing through the Cosatron system. Mr. Tyler Lenling of TEK conducted the baseline initial air sampling event on January 14, 2012 without the Cosatron System Operating and Mr. Joel Leland Conducted the second round of sampling on January 21, 2012 with the Cosatron system operating.

#### **EXECUTIVE SUMMARY**

Upon completion of air quality sampling and verification of particulates analyzed, TEK has determined through adequate placement of samplers within the roof top air handling units (RTU) and the 3<sup>rd</sup> party sample analysis that the Cosatron System operates properly to allow for the small charged particles to become clustered to increase sizes and allow for the filters media to trap the larger sized particles. This system proved to be of a very efficient addition to the filter system to work effectively during the most busiest time of Casino operation with high capacity of people and abundant smoking within the building.

TEK Environmental & Consulting Services, Inc.  
9263 E. M36, Whitmore Lake, MI 48189  
734.878.5588 Office 734.448.5088 Fax



The initial sampling in the chamber before (pre) the filter revealed extreme levels of particulates on the sample media without the Cosatron system operating. The air samples were analyzed with emphasis of total particulate NIOSH 0500 Method and additional Transmission Electron Microscopy to properly size the particles and classify them as clusters versus particulates.

TEK also conducted sampling with the Cosatron system in operation to evaluate Particulate sampling before (pre) sample and after (post) filters and Cosatron system. Sample proved to work adequately in reducing the number of larger particles as the Cosatron system proved to allow the clustered particles to filter out of the air space and smaller particles were reduced from the first sampling event on January 14, 2012 as the Cosatron clustered the smaller particulate.

The sampling in no way is representative of OSHA or ACGIH exposure limits as these concentrations of particulates are in abundance and no sampling was performed on personnel with respect to breathing zone atmospheres. All sampling was performed to determine a before and after relevance to particle size.

## **BACKGROUND**

Greentown Casino contacted DiHydro to perform particle sampling to determine the efficiency of the Cosatron System. As a result, DiHydro contracted TEK Environmental to perform industrial hygiene samples relative to a Cosatron Performance determination. The sampling was to be performed during the most occupied time in the Casino Gaming Floor on the most probable time of entertainment in the city of Detroit. TEK is unaware of the occupancy of the sampling dates as presented herein. Based upon the information provided, Particulate sampling by Gravimetric analysis along with transmission electron Microscopy (TEM) analysis was performed to determine overall airborne particulate results within the concentrated return air plenums.

## **COSATRON FILTRATION PRODUCT INFORMATION**

CosaTron is a unique and patented system that does not generate ozone, ionization, or high frequency interference. CosaTron is not an air filter. It is applied in combination with an air filter to enhance the performance of the filter.

The CosaTron System includes an electrode assembly located in the primary air handling unit, after the filters, before the heat transfer coils, on the suction side of the fan. The electrode assembly is made up of two elements, high voltage (HV) and high frequency (HF), separated by special insulators. The electrodes are powered by a patented generator connected to an ordinary 120 V, 60 Hz outlet, requiring the energy of a 50 watt light bulb. (Note: other power supply generators are available to meet each country's standards).

### **The 'Physics' of CosaTron®<sup>i</sup>**

There is a natural electrical field between the Earth and the upper atmosphere. At ground level, the electrical field intensity is, on average, about a hundred volts per meter. This natural electrical field is everywhere, including inside of buildings.

This natural electrical field inside buildings is rather complex; it is distorted by the electrical wiring in the walls, electrical equipment, metal ducts, etc. The electrical field inside of a room can be visualized as a distorted cobweb of electrical lines of force. In all rooms, there are a large number of particles in the air. Most of the particles come in from outside. These particles normally carry an electrical charge. These charges are due to cosmic rays, the slight radioactivity in building materials, frictional charging of materials, operating electrical equipment, etc.



The particles in a room vary in size. What happens to these particles in a room depends on their size. The larger ones are controlled by gravity, they tend to drift down and fall onto the floor. These are vacuumed up during normal housekeeping. The medium size particles are controlled by the air currents in a room that are created by the HVAC system. They are entrained by the air currents and carried to the returns, then to the filters and they are caught in the filters.

The fine particles, which are 98 percent of the total particles by count, are controlled by the normal electrical fields in a room and relatively few of them are entrained by the air currents. The fine particles, less than about 2 microns in size, are so light and have such small cross sectional area that the air currents do not see them, so to speak. From a physics standpoint, the fine particles are constantly moving along a room's electrical lines of force. They collide with other particles and tend to stick together. In physics, this is called coagulation. In this way, they ultimately form medium size particles. When they get to that size, they can be entrained by the air currents and carried to the filters. Details of the physics are available; they are spelled out in several published papers in scientific and engineering journals and can be further evaluated at [www.cosatron.com](http://www.cosatron.com).

### **CosaTron® In Operation**

CosaTron® is a patented high tech means to accelerate this natural process of coagulation, thereby minimizing contaminants in the air. There are number of papers published in scientific and engineering journals that report research that shows the effectiveness of CosaTron®. CosaTron's action occurs in the vicinity of its electrodes in the duct and continues in the room.

Specifically, air in a duct passes first through a filter which removes the medium size particles entrained by the air currents. Most of the fine particles in the air pass through the filter. This air then goes into the section of the duct which contains the CosaTron® high voltage high frequency fields which are created in the vicinity of the CosaTron® electrodes. In the CosaTron® HVHF field, the fine particles are accelerated and are driven in a lengthy chaotic path. This increases the probability of collision and greatly increases the rate of coagulation. These coagulated particles then go into the room via the supply diffusers. In the room air, they act like snowballs rolling down a hillside; they pick up many more fine particles. These, now medium size, particles can be entrained by the air currents, carried to the returns and are caught by the filters. Thus, since the natural process of coagulation is greatly enhanced by CosaTron®, the air in the room is kept much cleaner than it normally would be.

This action in the vicinity of the CosaTron® electrodes in the duct can actually be seen. It has been filmed in an actual duct using smoke particles so that the CosaTron® action is visible.ii

Research reported in additional scientific and engineering journals shows that CosaTron® is also effective in minimizing other contaminants such as VOCs, bacteria, viruses and odorants. The reason that CosaTron® is so effective against these other contaminants is that fine particles are typically carbonaceous. They absorb and adsorb these other contaminants somewhat like charcoal would. Thus, when the coagulated particles are entrained by the air currents and carried to the filters, these other contaminants are carried with them and are also removed.

CosaTron® is a patented high tech means to accelerate a well understood phenomenon in physics, i.e. coagulation of particulates. CosaTron® is a very effective means to minimize contaminants in a building and to save on energy costs; facts documented by research in the laboratory as well as in actual buildings and published in a number of scientific and engineering journals.

## GRAVIMETRIC PARTICULATE SAMPLING METHODOLOGY (NIOSH 0500)

### NIOSH 0500 Particulates Not Otherwise Regulated

Air testing for measurable concentration levels of Total Dust was conducted in reference to the NIOSH Method 0500 (Particulates Not Otherwise Regulated, Total) excluding asbestos and quartz greater than 1%. Sampling was conducted using personal sampling pumps calibrated between 1 and 2 liters per minute (lpm) with flexible connecting tubing attached with flexible tubing to a pre-weighed 37 -mm PVC, 2- to 5- $\mu$ m pore size membrane or equivalent hydrophobic filter and supporting pad in 37-mm cassette filter holder.

Samplers were secured to the interiors of RTU 03, RTU 22 and RTU23 prior to beginning the sampling interval. TEK then provided one sampler for each RTU before the filter media to determine total particulates by weight and a second sampler after the filters to determine particulate altered by the Cosatron system to illustrate reduced levels and sizes of particulate passing thru the filters. A DryCal® primary standard was used to calibrate the sampling pumps and record flow rates at the beginning and end of the sampling shift interval. Flow rates at the beginning and end of the work shift were calibrated and calculated as averages to obtain the most accurate flow rate in calculating the volume of air collected for the entire work period for each sample collected.

Samples were submitted under Chain-of-Custody control to Apex Research., third party laboratory, located in Whitmore Lake, Michigan, for gravimetric analysis. Sample volumes between 539 (low) and 691 (high) liters were collected for each sample (3) and the analytical reports for each sampling event are attached.

### JANUARY 14, 2012 - GRAVIMETRIC PARTICULATE SAMPLING RESULTS

Results for Total Particulate were determined to be based upon pre filter sampling and post filter sampling experience with particle sampling well within EPA governmental and industry standards and recommendations with the NIOSH 0500 Method. However Sample 003 was observed to have a much higher reading within the RTU and the interior gaming floor air conditions were unknown at the time of sampling. All Analytical Data information for sample analysis is included below. The following sections explain the parameter and associated results.

#### **Total Nuisance Dust (Particulates not otherwise regulated):**

Total Dust (Particulate) concentrations within occupied areas ranged from 3.29 mg/m<sup>3</sup> to 26.15 mg/m<sup>3</sup> in the areas sampled. The Occupational Safety and Health Administration (OSHA) has a Permissible Exposure Limit (PEL) of 15 mg/m<sup>3</sup> for the Construction Industry, which does not apply in the case of the subject commercial property as sampling was collected in a concentrated atmosphere at the intake of the return air from the Casino Floor.

Sample I.D. Number	Sample Location/ Description	Sample Results mg/m <sup>3</sup>
P-001	RTU 23 Intake before the filters	3.29 mg/m <sup>3</sup>
P-002	RTU 22 Intake before the filters	7.25 mg/m <sup>3</sup>
P-003	RTU 03 Intake before the filters	26.15 mg/m <sup>3</sup>

**LIMIT OF DETECTION 0.03 ug per filter**



## JANUARY 21, 2012 - GRAVIMETRIC PARTICULATE SAMPLING RESULTS

Results for Total Particulate were determined to be based upon pre filter sampling and post filter sampling experience with particle sampling well within EPA governmental and industry standards and recommendations with the NIOSH 0500 Method. Sampling was performed in an effort to determine the amount of particles that pass through the cosatron become filtered out by the media filters once the cosatron electro-statically charges the particles to become larger. Sample 003 was observed to have a much higher reading within the RTU and the interior gaming floor air conditions were unknown at the time of sampling. All Analytical Data information for sample analysis is included below. The following sections explain the parameter and associated results.

### Total Nuisance Dust (Particulates not otherwise regulated):

Total Dust (Particulate) concentrations within occupied areas ranged from 3.29 mg/m<sup>3</sup> to 26.15 mg/m<sup>3</sup> in the areas sampled. The Occupational Safety and Health Administration (OSHA) has a Permissible Exposure Limit (PEL) of 15 mg/m<sup>3</sup> for the Construction Industry, which does not apply in the case of the subject commercial property as sampling was collected in a concentrated atmosphere at the intake of the return air from the Casino Floor.

Sample I.D. Number	Sample Location/ Description	Sample Results mg/m <sup>3</sup>
P-001	RTU 23 Intake before the filters	4.32 mg/m <sup>3</sup>
P-002	RTU 23 Intake After the filters	0.44 mg/m <sup>3</sup>
P-003	RTU 22 Intake before the filters	2.90 mg/m <sup>3</sup>
P-004	RTU 22 Intake After the filters	1.19 mg/m <sup>3</sup>
P-005	RTU 03 Intake before the filters	1.27 mg/m <sup>3</sup>
P-006	RTU 03 Intake After the filters	1.91 mg/m <sup>3</sup>

LIMIT OF DETECTION 0.03 ug per filter

### TRANSMISSION ELECTRON MICROSCOPY (TEM) PARTICULATE SIZING METHOD

Air testing for size measuring concentration levels of Total Particulate was conducted in reference to the TEM Level II Analysis (Particulates Not Otherwise Regulated, Total) to determine the particle size difference prior to the Cosatron system operating. Sampling was conducted using personal sampling pumps calibrated between 1 and 2 liters per minute (lpm) with flexible connecting tubing attached with flexible tubing to 25 MM PCM 0.8 MCE Filter cassette.

A DryCal® primary standard was used to calibrate the sampling pumps and record flow rates at the beginning and end of the sampling shift interval. Flow rates at the beginning and end of the work shift were calibrated and calculated as averages to obtain the most accurate flow rate in calculating the volume of air collected for the entire workday for each sample collected.

Samples were submitted under Chain-of-Custody control to Apex Research., third party laboratory, located in Whitmore Lake, Michigan, for gravimetric analysis. Sample volumes between 388 (low) and 472 (high) liters were collected for each sample (3) and the analytical reports for each sampling event are attached. TEK collected an additional air sample in the Mechanical HVAC Space on the return side of AHU #8 that services the sales office.



**JANUARY 14, 2012 TEM PARTICULATE AIR TESTING RESULTS**

**Table**

Sample Number	RTU Number	Cluster Count (>0.3um)	Particulates Count (<0.3um)
TEM 001	RTU 23	23.9 mill/m <sup>3</sup>	>52 mill/m <sup>3</sup>
TEM 002	RTU 22	8.4 mill/m <sup>3</sup>	>70 mill/m <sup>3</sup>
TEM 003	RTU 03	4.5 mill/m <sup>3</sup>	>59 mill/m <sup>3</sup>

\*mill/m3 = million particles per cubic meter of air

**JANUARY 21, 2012 TEM PARTICULATE AIR TESTING RESULTS**

**Table**

Sample Number	RTU Number	Cluster Count (>0.3um)	Particulates Count (<0.3um)
TEM 001 (Pre Filter)	RTU 23	3.4 mill/m <sup>3</sup>	24.5 mill/m <sup>3</sup>
TEM 002 (Post Filter)	RTU 23	1.1 mill/m <sup>3</sup>	25 mill/m <sup>3</sup>
TEM 003 (Pre Filter)	RTU 22	10.6 mill/m <sup>3</sup>	18.6 mill/m <sup>3</sup>
TEM 004 (Post Filter)	RTU 22	2.1 mill/m <sup>3</sup>	18.8 mill/m <sup>3</sup>
TEM 005 (Pre Filter)	RTU 03	8.7 mill/m <sup>3</sup>	29.4 mill/m <sup>3</sup>
TEM 006 (Post Filter)	RTU 03	3.1 mill/m <sup>3</sup>	21.7 mill/m <sup>3</sup>

\*mill/m3 = million particles per cubic meter of air

**CONCLUSIONS**

Overall Total Particulate by weight and TEM size counting proved that the cosatron system is working properly and effectively. The sampling performed is not representative of OSHA Permissible Exposure Limits (PEL) or ACGIH measurements. TEK recommends the pre filters be changed in a frequent manner to prevent particulate pass through.

TEK Environmental & Consulting Services, Inc. would like to thank you for the opportunity to serve your environmental needs. If you have any questions regarding this information or additional concerns, please contact me at 734.878.5588.

Mr. Dillon  
Di Hydro-Greektown Casino

Page 8  
January 31, 2012

Respectfully,  
TEK Environmental & Consulting Services, Inc.

A handwritten signature in black ink, appearing to read 'Tyler S. Lenling', with a stylized, looping flourish at the end.

Tyler S. Lenling, RPIH  
Senior Indoor Air Quality Manager

Attachments: Particulate Sampling Analytical Data NIOSH 0500 with Chain of Custody Record  
TEM sampling Data and Analytical Chain of Custody Record

.C:\Users\User\Desktop\002 Greektown Casino Roof top AHU 1-14-2012\Cosatron Particulate Sampling Report.doc

TEK Environmental & Consulting Services, Inc.  
9263 E. M36, Whitmore Lake, MI 48189  
734.878.5588 Office 734.448.5088 Fax

**AIRBORNE GRAVIMETRIC PARTICULATE SAMPLING  
NIOSH 0500  
ANALYTICAL DATA  
WITH  
CHAIN OF CUSTODY RECORD**





**Certificate of Laboratory Analysis**  
Test Method, NIOSH 0500, Gravimetric Analysis

**Total Nuisance Dust**

Project: Greektown Casino - Rooftop  
AHU-RTU - 03, 22, 23  
Project # CI00291/002

**Report to:**

Mr. Tyler Lenling  
TEK Environmental & Consulting Services, Inc.  
P.O. Box 1046  
Pinckney, MI 48169

ARL Report # 12-G251  
Date Collected: 01/14/12  
Date Received: 01/17/12  
Date Analyzed: 01/20/12  
Date Reported: 01/20/12

*Weight*

**Sample Information**

**Results**

Lab ID #: G251-01 Client #: P-001 Location: RTU 23 - Intake Before Filters	<b>Limit of Detection</b> 0.03 ug per filter	3.29 mg/m <sup>3</sup>
Lab ID #: G251-02 Client #: P-002 Location: RTU 22 - Intake Before Filters	<b>Limit of Detection</b> 0.03 ug per filter	7.25 mg/m <sup>3</sup>
Lab ID #: G251-03 Client #: P-003 Location: RTU 03 - Intake Before Filters	<b>Limit of Detection</b> 0.03 ug per filter	26.15 mg/m <sup>3</sup>

Robert T. Letarte Jr., Laboratory Director

*This method is 0500 and determines the total Airborne Particulate. This method replaces S349.*





**Certificate of Laboratory Analysis**  
**Test Method, NIOSH 0500, Gravimetric Analysis**  
**Total Nuisance Dust**  
Project: Greektown Casino - Rooftop  
Project # CI00291/003

**Report to:**

Mr. Tyler Lenling  
TEK Environmental & Consulting Services, Inc.  
P.O. Box 1046  
Pinckney, MI 48169

ARL Report # 12-G252  
Date Collected: 01/21/12  
Date Received: 01/23/12  
Date Analyzed: 01/25/12  
Date Reported: 01/25/12

**Sample Information**

**Results**

Lab ID #: G252-01 Client #: P-001 Location: Unit 23 - Pre Filter	<b>Limit of Detection</b> 0.03 ug per filter	4.32 mg/m <sup>3</sup>
Lab ID #: G252-02 Client #: P-002 Location: Unit 23 - Post Filter	<b>Limit of Detection</b> 0.03 ug per filter	0.44 mg/m <sup>3</sup>
Lab ID #: G252-03 Client #: P-003 Location: Unit 22 - Pre Filter	<b>Limit of Detection</b> 0.03 ug per filter	2.9 mg/m <sup>3</sup>
Lab ID #: G252-04 Client #: P-004 Location: Unit 22 - Post Filter	<b>Limit of Detection</b> 0.03 ug per filter	1.19 mg/m <sup>3</sup>
Lab ID #: G252-05 Client #: P-005 Location: Unit 3 - Pre Filter	<b>Limit of Detection</b> 0.03 ug per filter	1.27 mg/m <sup>3</sup>

Robert T. Letarte Jr., Laboratory Director

*This method is 0500 and determines the total Airborne Particulate. This method replaces S349.*





**Certificate of Laboratory Analysis**  
Test Method, NIOSH 0500, Gravimetric Analysis  
Total Nuisance Dust  
Project: Greektown Casino - Rooftop  
Project # CI00291/003

**Report to:**

Mr. Tyler Lenling  
TEK Environmental & Consulting Services, Inc.  
P.O. Box 1046  
Pinckney, MI 48169

ARL Report # 12-G252  
Date Collected: 01/21/12  
Date Received: 01/23/12  
Date Analyzed: 01/25/12  
Date Reported: 01/25/12

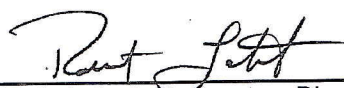
**Sample Information**

**Results**

Lab ID #: G252-06  
Client #: P-006  
Location: Unit 3 - Post Filter

**Limit of Detection**  
0.03 ug per filter

1.91 mg/m<sup>3</sup>

  
Robert T. Letarte Jr., Laboratory Director

*This method is 0500 and determines the total Airborne Particulate. This method replaces S349.*



**PARTICULATE AIR SAMPLING by TEM METHOD**

**ANALYTICAL DATA  
WITH  
CHAIN OF CUSTODY RECORD**



# Certificate of Laboratory Analysis

Test Method, D6602-03b Modified Polarized Light Microscopy

Presumptive Identification of Environmental Particulate (Smoke)

Using Transmission Electron Microscopy

Project: Greek Town Casino - Roof top

**Report to:**

Tyler Lenling

TEK Environmental & Consulting Services

P.O. Box 1046

Pinckney, MI 48169

ARL Report # 12-T1790

Date Collected: 01/14/12

Date Received: 01/17/12

Date Analyzed: 01/22/12

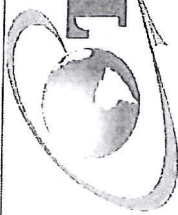
Date Reported: 02/02/12

Lab ID #	Particles Observed	Result*
<b>T1790-01</b>		
Client ID: Tem 001		
Location: RTU 22 Intake - Before Filters	Clusters, >0.3 um	23.9 mill/m <sup>3</sup>
Sample: Air		
Type: 25mm MCE Filter	Particulates, <0.3 um	>52 mill/m <sup>3</sup>
Lab ID #	Particles Observed	Result*
<b>T1790-02</b>		
Client ID: Tem 002		
Location: RTU 23 Intake - Before Filters	Clusters, >0.3 um	8.4 mill/m <sup>3</sup>
Sample: Air		
Type: 25mm MCE Filter	Particulates, <0.3 um	>70 mill/m <sup>3</sup>
Lab ID #	Particles Observed	Result*
<b>T1790-03</b>		
Client ID: Tem 003		
Location: RTU 03 Intake - Before Filters	Clusters, >0.3 um	4.5 mill/m <sup>3</sup>
Sample: Air		
Type: 25mm MCE Filter	Particulates, <0.3 um	>59 mill/m <sup>3</sup>
Lab ID #	Particles Observed	Result*
<b>T1790-04</b>		
Client ID: Tem 004		
Location: Field Blank	Clusters, >0.3 um	NA
Sample: Air		
Type: 25mm MCE Filter	Particulates, <0.3 um	NA
* (mill/m <sup>3</sup> = million particles per cubic meter of air)		

Robert T. Letarte Jr., Laboratory Director

Some particulates are not able to be identified by microscopic examination, all identifications are presumptive and confirmation of specific particulate should be confirmed by specific applicable methodology. APEX Research is not responsible for the sample collection or interpretation of results. The results are presumptive and analyzed to reflect the condition at the moment tested with understanding that results may vary with time and space. The above certificate of analysis relates only to the samples tested and to insure the integrity of results may only be reproduced in full. Liability limited to cost of analysis. Result imply no warranty.

COC AIR



**ENVIRONMENTAL  
& CONSULTING  
SERVICES, INC.**

PO Box 1046

Pinckney, MI 48169

Phone: 734-878-5588 E-mail: [info@tekenvironmental.com](mailto:info@tekenvironmental.com)

Fax: 734-448-5588

APEx # 06211

Lab Use Only  
Log-In \_\_\_\_\_  
Report

Site Name:

Di-Hydro

Building: Creekview Casino

Address, City, St., Zip:

Phone: \_\_\_\_\_ Fax: \_\_\_\_\_

Contact Person: N/A

Date of Survey:

Date of Survey: 1/14/12

Building Name: Crack Town CRACKTOWN

Project Location/Area: A44-KTU-03.23.23

TEK Project #: C100 291/002

### Mobile Phone (Optional):

## Turn Around Times:

(Circle One Below)

24 hour

48 hour

72 hour

12 hour Standard

Other: \_\_\_\_\_

### Analysis Type: Circle and Check

Asbestos	Bulk	Wipe	Point Count	TEM	PCM

Lead \_\_\_\_\_ Bulk \_\_\_\_\_ Wipe \_\_\_\_\_ Air \_\_\_\_\_ Paint-chip \_\_\_\_\_

Mold	Bulk	Cello-Tape	BioSIS	Viable/Non Viable
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Other Analysis

[illegible]

Comments:

Relinquished by:

ished by: [Signature]  
Date: 11/14/12

Received by:

Wood

Relinquished by:

Date: 1-17-12 APEX RESERVE NO. 1

3:56p



# Certificate of Laboratory Analysis

Test Method, D6602-03b Modified Polarized Light Microscopy

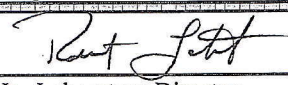


Presumptive Identification of Environmental Particulate (Smoke)  
Using Transmission Electron Microscopy  
Project: Greek Town Casino - Roof top

**Report to:**  
Tyler Lenling  
TEK Environmental & Consulting Services  
P.O. Box 1046  
Pinckney, MI 48169

ARL Report # 12-T1792  
Date Collected: 01/21/12  
Date Received: 01/23/12  
Date Analyzed: 01/23/12  
Date Reported: 02/02/12

<b>Lab ID # T1792-01</b>	<b>Particles Observed</b>	<b>Result*</b>
<b>Client ID: A001</b>		
<b>Location: Unit 23 - Pre Filter</b>	Clusters, >0.3 um	3.4 mill/m <sup>3</sup>
<b>Sample: Air</b>		
<b>Type: 25mm MCE Filter</b>	Particulates, <0.3 um	24.5 mill/m <sup>3</sup>
<b>Lab ID # T1792-02</b>	<b>Particles Observed</b>	<b>Result*</b>
<b>Client ID: A002</b>		
<b>Location: Unit 23 - Post Filter</b>	Clusters, >0.3 um	1.1 mill/m <sup>3</sup>
<b>Sample: Air</b>		
<b>Type: 25mm MCE Filter</b>	Particulates, <0.3 um	25 mill/m <sup>3</sup>
<b>Lab ID # T1792-03</b>	<b>Particles Observed</b>	<b>Result*</b>
<b>Client ID: A003</b>		
<b>Location: Unit 22 - Pre Filter</b>	Clusters, >0.3 um	10.6 mill/m <sup>3</sup>
<b>Sample: Air</b>		
<b>Type: 25mm MCE Filter</b>	Particulates, <0.3 um	18.6 mill/m <sup>3</sup>
<b>Lab ID # T1792-04</b>	<b>Particles Observed</b>	<b>Result*</b>
<b>Client ID: A004</b>		
<b>Location: Unit 22 - Post Filter</b>	Clusters, >0.3 um	2.1 mill/m <sup>3</sup>
<b>Sample: Air</b>		
<b>Type: 25mm MCE Filter</b>	Particulates, <0.3 um	18.8 mill/m <sup>3</sup>
* (mill/m <sup>3</sup> = million particles per cubic meter of air)		

  
Robert T. Letarte Jr., Laboratory Director

Some particulates are not able to be identified by microscopic examination, all identifications are presumptive and confirmation of specific particulate should be confirmed by specific applicable methodology. APEX Research is not responsible for the sample collection or interpretation of results. The results are presumptive and analyzed to reflect the condition at the moment tested with understanding that results may vary with time and space. The above certificate of analysis relates only to the samples tested and to insure the integrity of results may only be reproduced in full. Liability limited to cost of analysis. Result imply no warranty.



# Certificate of Laboratory Analysis

Test Method, D6602-03b Modified Polarized Light Microscopy




Presumptive Identification of Environmental Particulate (Smoke)  
Using Transmission Electron Microscopy  
Project: Greek Town Casino - Roof top

**Report to:**  
Tyler Lenling  
TEK Environmental & Consulting Services  
P.O. Box 1046  
Pinckney, MI 48169

ARL Report # 12-T1792  
Date Collected: 01/21/12  
Date Received: 01/23/12  
Date Analyzed: 01/23/12  
Date Reported: 02/02/12

Lab ID # T1792-05	Particles Observed	Result*
Client ID: A001		
Location: Unit 23 - Pre Filter	Clusters, >0.3 um	8.7 mill/m <sup>3</sup>
Sample: Air		
Type: 25mm MCE Filter	Particulates, <0.3 um	29.4 mill/m <sup>3</sup>
Lab ID # T1792-06	Particles Observed	Result*
Client ID: A002		
Location: Unit 23 - Post Filter	Clusters, >0.3 um	3.1 mill/m <sup>3</sup>
Sample: Air		
Type: 25mm MCE Filter	Particulates, <0.3 um	21.7 mill/m <sup>3</sup>
* (mill/m <sup>3</sup> = million particles per cubic meter of air)		

  
Robert T. Letarte Jr., Laboratory Director

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